

# Awareness of Dentine Hypersensitivity among General Dental Practitioners in Mumbai, India

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## Abstract

**Aim:** The aim of this study was to describe the perception of dentists in general dental practice on the diagnosis and management of dentine hypersensitivity (DH) as perceived by a randomly selected sample of private dental practitioners in Mumbai.

**Methods:** 500 dentists (Mean age 38-35 years [S.D = 11.3], 114 M: 92 F) were randomly selected using the Indian Dental Association membership list and invited to participate in a questionnaire-based survey.

**Results:** 206 private practitioners (GDPs) were included in the final analysis of the data. Most of these respondents [90.2%] indicated that half of their patients reported problems with DH; 78.2% respondents reported that the patients usually initiated the conversation on DH; and 83.4% indicated that up to 25% of their patients considered DH as a serious problem. A greater part of the respondents (62.2%) reported that the pain due to DH lasted  $\leq 4$  weeks. There was an overall awareness regarding the current mechanisms underlying DH, with the majority of dentists ( $\geq 66\%$ ) reporting inadequate brushing of the teeth as an initiating cause and approximately 50% suggesting periodontal causes amongst the other recorded reasons. The most common management strategy employed by dentists was to prescribe desensitizing agents for home use.

**Conclusion:** The conclusions from the present study were in agreement with the results from previous studies and generally consistent with the current scientific consensus on the management of DH by GDPs.

**Keywords:** Dentine hypersensitivity; Questionnaire; Etiological factors; Management; Perception; Pre-disposing factors

## Introduction

Dentine hypersensitivity (DH) has been defined 'as a distinctive short sharp pain arising from exposed dentine, characteristically in response to an array of stimuli including thermal, tactile, evaporative, osmotic or chemical, which cannot be attributed to any other form of dental defect, disease or pathology' [1]. Prudence for considering a differential diagnosis becomes mandatory when analyzing dental hypersensitivity as other problems such as caries, fractured or cracked teeth, defective restorations, occlusal trauma, or gingival conditions that could give rise to similar signs and symptoms [2]. The published literature provides evidence that the condition has not been clearly comprehended by dentists despite its higher prevalence [1,2].

Several published studies, comparing and reporting on the prevalence of DH in a group of patients attending a general dental clinic [3,4] and a dental hospital [5], suggest that the prevalence of DH was perceived to be higher in patients examined in specialist periodontology clinics and hospitals [6-8] as compared to those screened by the general dentists [9,10]. Furthermore, a wide variation in the prevalence of DH ranging from 1.1% to 98% was apparent, ascribing to differences in both the methodology as well as in the study and cultural setting [11-13]. Questionnaire studies analyzing patients' complaint of DH report a prevalence of up to 57% [14-16] whereas questionnaire studies determining the dentists' (General Dental Practitioners [GDP]) perspective recorded an occurrence of only 10% to 25% [1,17-22]. This illustrates a fundamental difference between the perception of DH from both the dentist and patient outlook which may have a potential impact on the Quality of life (QoL) of those who suffered from the problem [23,24].

Although extensive non-invasive treatment is currently available, as indicated by Kopycka-Kedzierawski et al., lack of diagnosis along with under-reporting of the condition presents a major obstacle for the success of any sound treatment plan [1,2,25]. This has led to concerns about the

management and treatment of the condition by dentists. Furthermore, there is a dearth of literature concerning the Indian population in this regard. The objective of this study was therefore specifically focused to describe the perception and awareness of a randomly selected sample of private dental practitioners in Mumbai, India on the occurrence, predisposing factors, triggers, diagnosis and management of DH.

## Aim of the Study

The aim of this study was to describe the perception of dentists' in general dental practice on the diagnosis and management of dentine hypersensitivity (DH) as perceived by a randomly selected sample of private dental practitioners in Mumbai.

## Objectives of the Study

1. To evaluate the incidence and prevalence of DH in general dental practice across city of Mumbai.
2. To evaluate the knowledge and awareness of the GDPs about the etiology, diagnosis and management of DH
3. To comprehend the perception of the GDPs towards the patients benefits and concerns regarding DH.

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## Methodology

The study was approved by the Institutional Ethics Committee of M.G.M. Dental College Kamothe, Navi Mumbai, India.

### Inclusion criteria

All dental professionals practicing in Mumbai district region.

### Exclusion criteria

Dental professionals who declined to participate in the study. Questionnaires that were incomplete or duplicated were also excluded.

An e-mail based survey was undertaken for 500 registered dentists with a Bachelor of Dental Surgery (BDS) degree, currently practicing in Mumbai, India. This study was approved by the Institutional Ethical Review Committee (IERC no. 28/2015). The Indian Dental Association (IDA) Mumbai region membership list was used as the sampling frame to randomly select 1000 general dental practitioners (GDP) who were invited to participate in the present questionnaire study. A Google survey form was created of questions based on a previously validated questionnaire used in the United Kingdom, which incorporated queries on worldwide reports about DH including on its prevalence, the important predisposing factors, major triggers, mechanisms, differential diagnosis, patient management, dentist management and continuing education relating to DH [18]. This helped to maximize the response rate from dentists and enable ease of data handling and analysis.

A personalized message explaining the aim of the study, instructions to be followed and the link to the Google survey form was mailed to each of the participants fulfilling the inclusion criteria. Anonymity was ensured at all levels of the study. The initial part of the questionnaire was designed to elicit the demographic characteristics of dentists and included years in practice, number of DH cases they treated in their practices, their initial approach to such cases, the impact of DH on the QoL of their patients. Following this, a set of questions enquired on the diagnosing ability and treatment planning skills of the dentist. Conclusively, the final section focused on dentists' perspective of their patients presenting with DH and future scope on improvement in its management in dental practice.

### Data collection

Data were collected over a period of six months from October 2015 to March 2016 with repeated reminders, sent out to the dentists monthly to maximize the response rate of the dentists. Data were entered using the Google survey form, and the results analyzed using SPSS 22.0 for Windows (IBM, Portsmouth UK) in presented in the form of frequency distribution tables and pie charts.

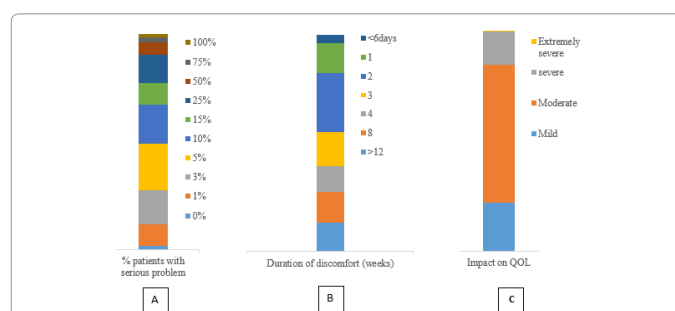
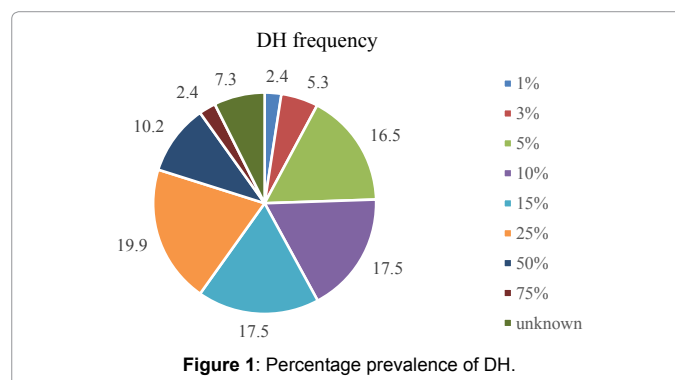
## Results

Of the 500 GDPs who were invited to participate in the study via e-mail, 215 GDPs completed the online questionnaire; this number was further reduced to 206 following editing out of the duplicates and thus the response rate was 41.2%. The demographic data of the population studied is presented in Table 1.

The prevalence of DH was assessed by enquiring about 1) regularity of patients reporting problem of DH; 2) patients visiting the practice with DH as the chief complaint; 3) frequency of patients asking questions with regards to DH. 190 (92.2%) of the participants responded positively to seeing one or more patients reporting DH out of which 41 (19.9%) reported that about 25% of total visiting patients complained of

S. no	Variables		Data
1	Age (range from 23 -75 years)		38.35 ± 11.3 years (mean)
2	Sex	Male	114
		Female	92
3	Professional status	Dentist	147 (71.4%)
		Dental student	53 (25.7%)
		Post-graduate student	5 (2.4%)
		Missing value	1 (0.5%)
4	Experience	Not graduated	3 (1.5%)
		< 5 years	87 (42.2%)
		6-9 years	40 (19.4%)
		10-19years	31 (15%)
		20-29 years	20 (9.7%)
		30-39 years	7 (3.4%)
		Missing values	18 (8.7%)
5	Patients per Practice per year	<499	37 (18%)
		500	29 (14.1%)
		1000	24 (11.7%)
		1500	11 (5.3%)
		2000	9 (4.4%)
		>2500	41 (19.9%)
		Not known	44 (21.4%)
		Missing value	11 (5.3%)

**Table 1:** Demographic data of the study population.



DH (Figure 1). A total of 161 (78.2%) said that patients usually initiated conversation about DH and in patients who did not report of DH, most dentists 111 (53.9%), tried to initiate the conversation. A greater part of the responders, 163 (79.1%), conveyed that DH was commonly observed during routine clinical examination (Figure 1).

Most clinicians interviewed noted that DH was considered as a serious problem in about 5-10% of patients (Figure 2A) and 48 (23.3%)

reported that the patients' testified that discomfort usually lasted for about 2 weeks (Figure 2B). A total of 144 (69.9%) participants felt that DH affected the QOL, of which 112 (54.4%) found the impact on QOL to be moderate (Figure 2C).

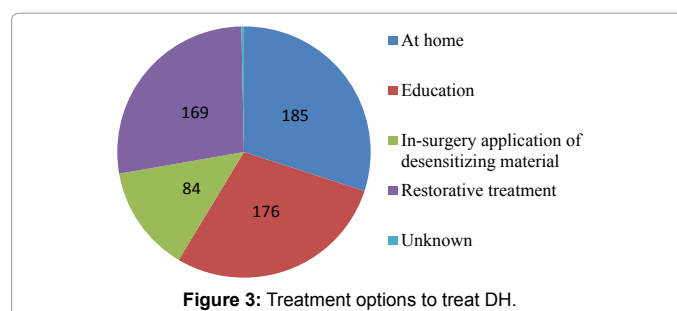
To evaluate the dentist's knowledge, questions were asked with regards to etiology, diagnostic methods and treatment options for DH. The respondents mainly attributed the etiology of DH to Dental Caries (158 [76.7%]), tooth brushing habits 83 (18%) and acid erosion (54%). In addition to the above causes chosen, about half of the participants [105 (51%)] reported that non-dental causes also could attribute to DH.

Most participants seemed to choose detection of hypersensitivity testing using evaporation [77 (37.4%)] as important diagnostic aids for DH (Table 2).

Most of the respondents [70 (34%)] voted for 'Hydrodynamic theory' to be the currently accepted hypothesis of cause of DH. Also,

S. no	Variables	Data (n)
1	Tooth brushing	83
	Abrasion	54
	Acid erosion	42
	Attrition	42
	Gingival recession	38
	Caries	26
	Grinding	24
	Systemic	19
	Exposed tubules	14
	Fractured restorations	14
	Occlusal interference	14
	Periodontal disease	13
	Chipped tooth	10
	Cracked tooth syndrome	7
	Stress	7
	Abfraction	6
	Post sensitivity	6
	Leaking restorations	5
	Age	4
	Periodontal Rx	4
	Bleaching	4
	Fluid movement	3
	Tooth preparation	2
	DNK	1
	Dental caries	158
	Dry mouth	1
2.	Clinical DH evaporative	77
	Clinical DH cold	55
	DH history	55
	Clinical exam	35
	Clinical DH hot	32
	Clinical DH probe	22
	Radiographs	17
	Others	14
	Vitality tests	13
	Medical history	12
	Percussion	5
	Periodontal treatment	5
	Differential diagnosis	4
	Tooth crown fracture	3
	Recession	2
	Periodontal condition	2

**Table 2:** Etiology and diagnostic aids.



**Figure 3:** Treatment options to treat DH.

a smaller population of 17 (8.3%) chose 'Stimulus transfer through exposed dentine' to be the accepted theory.

Most participants [131 (63.6%)] claimed to be 'Confident' in diagnosing DH, whereas only 34 (16.5%) chose 'very confident'; 32 (15.5%) chose 'Somewhat confident' as options. Very few 5 (2.4%) indicated that they were 'Not at all confident'.

With regards to treatment options, maximum participants opted to use At-home desensitizing dentifrice 185 (89.8%) followed by 'Educating the patient about DH' as selected by 176 (85.4) dentists (Figure 3).

When asked about patient compliance to the treatment prescribed, almost half of the respondents [108 (52.4%)] reported that patients did comply with the dentist's instructions. Many of the participants, 146 (70.9%), also perceived the need to make patient leaflet/folder which would provide information about the condition and how to prevent it from becoming a problem for the patient, to provide more information on DH.

## Discussion

This questionnaire survey, aimed at dentists, was styled in a closed personalized manner and a realistic response analysis was conducted. It was noted that on average the response rate was only 41.2%, considering that these individuals were the first line investigators across the city and as such would have direct interaction with numerous patients with a range of conditions on an everyday basis, the response rate was somewhat disappointing. The non-response of the participants may be in part because of a lack of knowledge and understanding of the subject and consequently a reluctance to return their replies. It could also be ascribed, in particular, to the limited understanding of this condition by dentists and the uncertainty surrounding the condition [17,22] and in general to factors including lack of time and modest priority given by general practitioners to mailed questionnaires [26] although the response rate recorded in the present study was virtually comparable to the other studies conducted along similar lines [1,18].

Most of the participants had dental practice experience of less than 10 years and a patient flow in a range of < 499 to > 2500. About 92% dentists reported that they saw patients with DH in a period as short as a fortnight with the average prevalence during general practice being in the range of 10 to 25%. This was in accordance with the results from other studies where the prevalence of DH ranged from 13% to 18% [21] but was lower compared to the findings of other investigators who reported higher prevalence rates of over 50% [5,7,15]. Such discrepancies could however, be mainly attributed to the methodology adopted since studies based on general practice populations, appear to yield relatively lower prevalence rates [9,10,27] in comparison to those focused on specialized and hospital clinics [5,7]. A recent study in India by Babu et al. [28] comparing urban and rural areas reported that the

prevalence of DH was 33.3% which was similar to a study by Dodhiya et al. [29] in the same geographic area (22.5%).

An exaggerated number of choices were given with respect to questions on etiology, diagnosis and treatment strategies for DH. It was noticed that most practitioners considered dental defects or pathology (caries, abrasion, erosion etc.) to be the major etiological and attributing factors for DH and therefore opted for diagnostic methods and treatment strategies for managing the same. Numerous respondents also believed that non-dental causes could also attribute to DH. This to some extent may reflect the enigmatic nature of the condition as reported in the published literature [30]. In view of the vagueness of some of the causes of DH, this lack in reporting, may to some extent be understood. Incorrect brushing of the teeth was mentioned by 40% of the sample together with 18-20% opting for acid erosion and gingival recession, but retraction of the gingiva due to periodontal disease, surgical treatment and/or improved home cleaning was also reported by less than 5% of the participants. The importance of erosion in the published studies is interesting and it appears that it may be dependent on where the studies take place, for example, in European countries; the prevalence of erosion in young adults is well established [31]. This may not be the main etiological feature that is reported in other countries where gingival recession with or without abrasion and attrition is more commonly reported [30]. Besides, most of the GDPs in the present study did consider the importance of differential diagnosis in excluding other possible causes of tooth sensitivity from DH, whereas a relatively lower proportion of them used just routine screening for DH. Although differential diagnosis constitutes an essential part of DH management, screening is considered critical for the establishment of any DH diagnosis. Furthermore, definition of DH defies all other causes to be labelled as DH. Additionally, most GDPs claimed that their patients frequently asked questions about the condition with 78.2% of the GDPs reporting that the patient usually initiated the conversation about DH prior to diagnosis. In cases where patients' ignorance was noticed, the GDPs positively screened for relevant signs and symptoms. This would suggest that although the GDPs were looking for signs and symptoms of DH, they lacked the knowledge and skill to accurately ascribe causes for DH. According to Amarasena et al. [20] it was apparent, that the majority of Australian dentists were aware of the importance of predisposing factors such as abrasion, gingival recession, erosion and attrition as well as the relevance of triggers including cold, air and acid stimuli in the etiology of DH. This was also in agreement with the perceptions of the dentists from different countries [32-34].

From the reported questionnaire studies, it was evident that only 25% of the patients perceived DH to be a severe problem and consequently did not seek treatment [15,24]. Overall DH was perceived by these patients to be a low-grade pain, of slight concern, occasionally lasting up to 5 years and not sufficiently severe for either self-treatment or seeking professional help. Of those patients who complained of DH, were reported to use an over the counter toothpaste only during a specific period of discomfort. Regarding the duration of DH, 62.2% of the GDPs reported the pain to last no more than 4 weeks whereas 23.3% indicating that the discomfort of the patients lasted for about 2 weeks. Data on the persistence of DH is often reported from anti-sensitivity treatment trials, but some individuals have suggested that their pain might last for years. The GDP's perception of the pain duration may also be influenced by either their unreliable recollections or the behavior of the patients. For example, patients who accept the presence of a mild pain probably do not visit a dentist [35,36]. Patients, who are advised by their GDP to deal with the DH by home-care, may, however be less inclined to consult the GDP again in case of any lingering minor pain.

Moreover, patients may have become accustomed to the discomfort and subsequently may learn to develop coping mechanism to prevent triggering the pain, for example, by avoiding the contact of cold food/drinks with the sensitive areas.

One of the concerns raised by several investigators was the apparent lack of confidence by GDPs in the management of DH [1,2]. Most responding GDPs provided a wide range of treatment options which included both In-office and OTC products which appears to be consistent with other studies [32]. Furthermore, it was evident from their replies that GDPs also considered that their advice on DH was generally effective and 61.7% of the GDPs reported their patients frequently complied with professional advice regarding the treatment and management of DH. Nevertheless, it was interesting to note, that nearly 1% of the responding GDPs expressed uncertainty of any appropriate management strategies of DH, which was lower in comparison to 50% of the Canadian respondents in the Consensus document (1), who reported that they lacked confidence in managing DH. The commonest DH management strategy reported in studies was the home use of desensitizing toothpaste [25]. This strategy was adhered to by 51% of the sample in the present study, who were very confident about prescribing desensitizing agents for home use and/or modifying predisposing factors. Nearly 89.8% expressed confidence in recommending appropriate treatment such as at-home materials. As there was no universal consensus regarding which particular strategy (in terms of an ideal product) was completely effective in managing DH [37], it may be sensible to use a minimally invasive treatment procedure using a stepwise approach initially with a simple non-invasive approach when treating minor discomfort and escalating the treatment in examples of increasing (severe) pain. One of the recommendations by Orchardson and Gillam [38] in their stepwise management strategy was that the first line of management of DH should be the removal/modification of causes and/or predisposing factors of DH coupled with the daily use of desensitizing toothpastes.

Apparently, 34% of GDPs were aware that the hydrodynamic theory was the currently accepted mechanism of pain from DH. There was also awareness that untreated predisposing factors together with the impact of an acidic environment due to dietary behavior were the main reasons for the open dentine tubules, which was in agreement with the current consensus on the initiation and continuance of DH. Assessing the effect of DH on QoL was another interesting aspect of this survey. A greater proportion of respondents, 69.9%, observed that DH did affect the QoL with 54.4% reporting the impact to be moderate in nature. This finding is significant as it demonstrates an awareness of the respondents have an awareness that the condition may have a meaningful impact on the QoL of these patients complaining on the condition. This observation supports the conclusions of previous studies that have reported an association [23,24].

This was the first study conducted in India which has tried to cover all aspects of DH in greater detail. However, the decreased response rate obtained truncates the accuracy of results. The resulting bias into the analysis of the results should be considered with caution and therefore the results cannot be attempted to generalize into the larger general dental practitioner population. The data available in the published literature and the apparent lack of substantial correlations between the reported conditions of DH and the reported treatment modalities may point to a deficiency in the knowledge of GDPs. Although the available information relating to the prevalence and etiology of DH is somewhat conflicting in nature and this may be due to the different methodological approaches used to collect the data. This may be the



reason why many of the GDPs in the present study restricted themselves to home-care recommendations. However, it was apparent that most of the GDPs appeared to be reasonably aware of the current knowledge on the main issues involving DH which was in general agreement with Amarasena et al. [20]. The observation that many of the GDPs expressed a need for guidelines for their patients, may, however indicate that the GDPs either considered the treatment of DH to be problematic or they were unsure of how to inform their patients adequately. This necessitates the need of additional education strategies to be practiced in everyday routine including modes like information pamphlets or leaflets, informative videos etc. Additionally, routine lectures and CDE programs should be conducted to update the GDPs adequately on the condition. This would in turn help them to be updated regularly about the various advancements in diagnosing and managing the condition. Also, research needs to be channelized towards establishing defined criteria of classifying DH along with its management strategy for ultimately providing concise treatment for earlier management of the same. In this regard, a consideration for future studies could include a training programme to enable practitioners to provide standardized reporting similar to that used in the PEARL and PRECEDENT Practice Based-Research Network (PBRN), in the USA [25,32,33].

## Conclusion

In conclusion, the results from the present study indicated that the perception of most participating GDPs on the prevalence and etiology, as well as diagnosis and management of DH, was generally consistent with the current scientific consensus on DH. In order, however to enable GDPs to keep up to date with updated information on the management and treatment of DH it may be recommended be involved in ongoing research programs in general practice, such as the PEARL and PRECEDENT Practice Based-Research Networks (PBRN) as developed in the USA. This may provide training for the GDPs to accurately report on the prevalence and incidence of DH as well as effectively manage DH. Most GDPs in the present study stressed the importance of maintaining a patient information pamphlet on DH in the dental practice.

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